



FAA-E-2090c

April 28, 1970

SUPERSEDING

FAA-E-2090b, 1/26/67

DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION SPECIFICATION

ANTENNA, UHF DISC-CONE

1. SCOPE

1.1 Scope.— The equipment described herein is a UHF disc-cone communication antenna using vertical polarization.

2. APPLICABLE DOCUMENTS

2.1 FAA specifications.— The following FAA specifications of the issues specified in the invitation for bids or request for proposals form a part of this specification, and are applicable to the extent specified herein:

FAA-G-2100/1 Electronic Equipment, General Requirements; Part 1,
General Requirements for All Equipments

(Copies of this specification and other applicable FAA specifications, standards and drawings may be obtained from the Contracting Officer in the Federal Aviation Administration office issuing the invitation for bids or request for proposals. Requests should fully identify material desired, i.e., specification, standard, amendment, and drawing numbers and dates. Requests should cite the invitation for bids, request for proposals, or the contract involved or other use to be made of the requested material.)

3. REQUIREMENTS

3.1 Equipment to be furnished by the contractor.- Each antenna furnished by the contractor shall meet all the requirements of this specification. Instruction booklets shall be in accordance with FAA-D-1272, and quantities shall be furnished as specified in the contract schedule.

3.2 Applicability of FAA-G-2100/1.- The following portions of FAA-G-2100/1 shall apply hereto. At the option of the contractor, additional portions may be adopted.

FAA-G-2100/1

Paragraph Number

1-2	1-3.10.10.6
1-3.2.3 to 1-3.2.5	1-3.12.8 to 1-3.14.4
1-3.2.11	1-3.14.8 to 1-3.15.3.4
1-3.2.18	1-3.16.3.1
1-3.2.23	1-3.16.3.3 (Type "N" connectors only)
1-3.3.2	1-3.16.13 to 1-3.16.13.8
1-3.4.1 to 1-3.4.3	1-4.1 to 1-4.3.1.2
1-3.5.9.1	1-4.3.2 (delete "rating tests" and
1-3.8.1	"other general specification tests")
1-3.8.4 to 1-3.8.8	1-4.3.3 to 1-4.3.4
1-3.10.3	1-4.4 to 1-4.7
1-3.10.10 to 1-3.10.10.2	1-4.10 to 1.5.1

3.2.1 Ambient conditions.- The ambient conditions shall be those of Environment III (1-3.2.23, FAA-G-2100/1).

3.3 Electrical characteristics

3.3.1 Frequency range.- The frequency range of the antenna shall be 225 through 400 MHz, and it shall meet all the requirements of this specification without having to be adjusted or tuned.

3.3.2 RF power rating.- The antenna shall be capable of continuous operation with an 800 watt PEP signal input (200 watts carrier modulated 100% with a 1,000 Hz signal).

3.3.3 RF impedance.- The antenna shall be designed for direct operation with a 50 ohm coaxial transmission line.

3.3.4 Standing wave ratio.- The voltage standing wave ratio (SWR) shall be not more than 2.0 through the frequency range.

3.3.5 Radiation characteristics.- When the antenna is oriented in its normal operating position and operating at all frequencies within the

frequency range specified in 3.3.1, the radiated signal shall be vertically polarized and the radiation pattern shall also conform to the subparagraphs below.

3.3.5.1 Horizontal radiation pattern.- The horizontal radiation pattern shall be omni-directional without variation from circular by more than plus or minus 0.5 dB.

3.3.5.2 Power gain.- In the horizontal plane the power gain of this antenna shall be not less than 1.5 dB better than an isotropic radiator.

3.3.5.3 Leakage.- With 500V applied across the input connectors the leakage current of a dry antenna assembled in a normal room environment shall not exceed ten micro-amperes.

3.4 Mechanical requirements

3.4.1 Coupling.- The input/output connector shall be type N (captivated pin) and shall be readily accessible for connecting and disconnecting a transmission line by removing the antenna mount from the galvanized pipe (3.4.2). The connector shall be located within and centered in the antenna mount. No portion of the input/output connector shall extend beyond the antenna mount.

3.4.2 Antenna mount.- The antenna mount shall be metal and suitable to mate with a vertical 1-1/4 inch I. P. S. galvanized pipe. The mount shall extend one inch over the end of the galvanized pipe and contain a minimum of three 1/4 inch set screws suitable to fasten the mount securely to the galvanized pipe. The set screws shall be spaced equally about the circumference of the mount and 1/2 inch above the mount end.

3.4.3 Dimension.- The overall length of the antenna and mount shall not exceed four feet.

3.4.4 Weight.- The total weight of the antenna and mount shall not exceed 15 pounds.

3.5 Nameplate.- The nameplate for the antenna shall be in accordance with 1-3.13 of FAA-G-2100/1, reduced in size and mounted on the antenna. The nameplate title shall be ANTENNA, UHF DISC-CONE.

3.6 Antenna finish.- All visible metal parts shall be alkali etched and completely coated with a suitable primer, baked on, followed by a complete coat of light gray enamel, baked on. The contractor shall furnish certification that the primer and finish coat of paint is suitable for outdoor use over a temperature range from -50°C to +70°C and relative humidity of 100 percent.

3.7 Design and construction.- The electrical and mechanical details not specified herein shall conform to the highest professional engineering practices. The antenna shall be constructed so that the outer surface will be smooth, durable, and of a shape which offers low wind resistance and low susceptibility to the accumulation of ice. The unit shall be water-proof.

3.8 Antenna elements.- The antenna elements shall be detachable. Each element shall be secured using a locking device.

3.3.5.3 Leakage.- With 500V applied across the input connectors the leakage current of a dry antenna assembled in a normal room environment shall not exceed ten micro-amperes.

4. QUALITY ASSURANCE PROVISIONS

4.1 General inspection provision.- Inspection shall be in accordance with 1-4 of FAA-G-2100/1 and include the following tests.

4.2 Design qualification tests

4.2.1 Normal test conditions.- The following design qualification tests shall be made under normal test conditions:

<u>TEST</u>	<u>PARAGRAPH</u>
RF Power Rating	3.3.2
This test shall be conducted at one frequency between 380 to 400 MHz under the conditions as stipulated in paragraph 3.3.2 for a minimum period of four hours. Upon completion of the test the antenna shall be dismantled, thoroughly inspected for evidence of arcing, over-heating, etc. In addition to the performance of the test, the contractor shall demonstrate by means of design calculations and part specifications the ability of the equipment to meet the RF power rating at all combinations of temperature, humidity, and altitudes as defined under service conditions (3.2.1).	
Radiation Measurements	3.3.5 - 3.3.5.2
The disc-cone antenna shall be used as a transmitting antenna to measure the vertically polarized radiated field intensity, the results of which shall be plotted on polar graph paper, marked in dB above and below an isotropic antenna, for inclusion in the instruction booklet. The receiving antenna shall be spaced a minimum of six wave lengths from the antenna under test. Sufficient measurements shall be made from which a smooth curve can be plotted from 0 to 360 degrees in the horizontal plane and 0 to 90 degrees (horizontal to vertical) in the vertical plane. Check at 25 MHz increments from 225 through 400 MHz.	
Wind and Ice Loading	3.2.1
(To be accomplished in accordance with paragraph 1-4.10 specification FAA-G-2100/1.)	

Immersion Test

3.7

The antenna shall be immersed in tap water for 24 hours. Remove and allow to stand under existing room temperature and humidity conditions for not more than one hour. With 500V applied across the antenna input connectors, the leakage currents due to moisture shall not exceed ten micro-amperes.

4.3 Type tests

4.3.1 Normal test conditions.- The following type tests shall be made under normal test conditions. Check at 225,312 and 400 MHz as a minimum.

<u>TEST</u>	<u>PARAGRAPH</u>
SWR	3.3.4, 3.3.1

4.4 Production tests.- The following production tests shall be made.

<u>TEST</u>	<u>PARAGRAPH</u>
SWR (225, 312, 400 MHz)	3.3.4
Leakage (Dry)	3.3.5.3

5. PREPARATION FOR DELIVERY

5.1 General.- See FAA-G-2100/1

6. NOTES

6.1 None.

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